

Bells Ford Bridge  
Seymore  
Jackson  
Indiana

HAER NO. IN-46

HAER  
IND,  
36-SEYM,  
1 -

REDUCED COPIES OF MEASURED DRAWINGS

Historic American Engineering Record  
National Park Service  
Department of the Interior  
Washington D.C. 20240

ADDENDUM TO:  
BELLS FORD BRIDGE  
Spanning East Fork White River at State Route 258  
Seymour  
Jackson County  
Indiana

HAER IN-46  
*IND,36-SEYM,1-*

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

REDUCED COPIES OF MEASURED DRAWINGS

HISTORIC AMERICAN ENGINEERING RECORD  
National Park Service  
U.S. Department of the Interior  
1849 C Street NW  
Washington, DC 20240-0001

# HISTORIC AMERICAN ENGINEERING RECORD

## ADDENDUM TO BELLS FORD BRIDGE

HAER No. IN-46

LOCATION: Spanning East Fork White River at State Route 258, Seymour, Jackson  
County, Indiana  
UTM: 16.592739.4314380, Seymour, Indiana Quadrangle

STRUCTURAL  
TYPE: Post through truss covered bridge

DATE OF  
CONSTRUCTION: 1868

DESIGNER/  
BUILDER: W.L. Hull, architect  
John H. Blish, engineer  
McNairy Claflen & Company, fabricator  
Robert Pattison, contractor

OWNER: Jackson County, Indiana

PREVIOUS USE: Vehicular bridge

PRESENT USE: Bypassed 1970

SIGNIFICANCE: Bells Ford Bridge is the only combination Post truss bridge, and one of only four Post truss bridges of all types surviving in the United States. It symbolizes the significant role railroads played in the development of bridge truss technology in the mid-nineteenth century.

HISTORIAN: Researched and written by Lola Bennett, October 2003, updated January 2006

PROJECT  
INFORMATION: The National Covered Brides Recording Project is part of the Historic American Engineering Record (HAER), a long-range program to document historically significant engineering and industrial works in the United States. HAER is administered by the Historic American Buildings Survey/Historic American Engineering Record, a division of the National Park Service, U.S. Department of the Interior. The Federal Highway Administration funded the project.

**Chronology**

- 1805 America's first covered bridge built at Philadelphia.
- 1816 Indiana becomes the nineteenth state admitted to the Union.
- 1834 Indiana's first covered bridge completed on National Road near Straughn.
- 1852 Jeffersonville & Indianapolis Railroad lays tracks through "Mules Crossing"; Meedy Shields erects a saw mill and plats the future town of Seymour.
- 1853 Simeon Post appointed Chief Engineer of Ohio & Mississippi Railroad.
- 1863 Simeon Post receives patent for an "improvement in iron bridges."
- 1863 Henry Claflin and Albert McNairy establish McNairy, Claflin & Co. at Cleveland.
- 1867 Members of Seymour Citizen's Association petition for a bridge across White River.
- 1868 Seymour Bridge Company formed.
- 1869 Bells Ford Bridge opened for travel.
- 1874 Bells Ford Bridge made free.
- 1882 Bells Ford Bridge becomes part of Seymour, Courtland & Freetown Gravel Road.
- 1885 Robert Pattison dies at Evansville, Indiana.
- 1896 Bells Ford Bridge made free.
- 1897 Original timber trestle approach on east end replaced with steel stringer approach.
- 1908 Bells Ford Bridge roof replaced.
- 1934 Bells Ford Bridge turned over to Indiana State Highway Commission.
- 1970 Bells Ford Bridge bypassed.
- 1971 Bells Ford Bridge recorded by the Historic American Engineering Record.
- 1999 Western span collapses in a windstorm; pieces salvaged and stored.
- 2003 Bells Ford Bridge recorded by the Historic American Engineering Record.
- 2005 Bells Ford Bridge listed on the National Register of Historic Places.

## Introduction

In 1834, Indiana's first covered bridge was built on the National Road near Straughn. Historians estimate that at least 600 covered wooden bridges were built in Indiana.<sup>1</sup> Over time, most of these bridges were lost to floods, replacement, neglect or arson. In 1930, when the Indiana Historical Society and the Indiana Highway Department formed the Covered Timber Bridge Committee to document the state's surviving covered bridges, there were less than 200 remaining.<sup>2</sup> Today, there are ninety covered bridges in Indiana.

The Bells Ford Bridge is nationally significant as the only surviving combination Post truss bridge in the United States. It symbolizes the significant role railroads played in the development of bridge truss technology in the mid-nineteenth century. It is an excellent example of the work of McNairy Claflin & Company of Cleveland, Ohio, an important nineteenth century bridge fabricating firm.

## Description<sup>3</sup>

As originally built, the Bells Ford Bridge was a 325' two-span timber and iron covered bridge on cut stone piers with a long timber pile approach at the easterly end.<sup>4</sup> The eastern approach was recently removed from the east end, and in 1999 the western span blew down in a windstorm, leaving only a single span hovering precariously above the water. The bridge is 14'-9" high between the centers of the chords, 17'-7" wide between the centers of the trusses, and has a 16'-6" wide roadway. The surviving span has fifteen panels spaced at approximately 10', plus 5' end panels, for a clear span length of approximately 160'.

The trusses have parallel upper and lower chords connected by a web of timber compression members and wrought iron tension members. Three parallel sticks (one 9"x10<sup>3</sup>/<sub>4</sub>" timber flanked by two 5"x10<sup>3</sup>/<sub>4</sub>" timbers) bolted together comprise the upper chord. The lower chord is composed of a series of parallel wrought iron bars, increasing in number toward the center of the span, and bolted together at each panel point. The ends of the lower chord are slotted castings that frame into shoes for the endposts. The chords are connected by paired 6<sup>1</sup>/<sub>4</sub>"x12" vertical endposts, single timber compression members (varying from 6<sup>3</sup>/<sub>4</sub>"x8<sup>3</sup>/<sub>4</sub>" at the center to 9 5/8"x8<sup>3</sup>/<sub>4</sub>" at the ends) inclined at 20 degrees up towards the center of the bridge, single diagonal rods (1-1/8" to 1<sup>1</sup>/<sub>2</sub>" diameter) inclined up towards the center within each panel, and paired diagonal iron bars (increasing in size from 3/4"x3/4" at the center to 1<sup>1</sup>/<sub>4</sub>"x1<sup>1</sup>/<sub>4</sub>" at the ends) inclined

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1 "Covered Bridges in Indiana," *Indiana History Bulletin* 69 (March 1998): 1.

2 The committee gathered statistics, took documentary photographs, collected news clippings, and corresponded with bridge builders' families and local historians to create an archive on the covered bridges in the state. The "Covered Bridge Collection" in the Indiana Historical Society Library is an archive of Indiana's covered bridges in the mid-twentieth century.

3 The surviving Bells Ford span is currently closed and inaccessible. Descriptive information is taken from historic photographs and HAER measured drawings completed in 1971.

<sup>4</sup> Bell Ford, located one-half mile downstream, was named for Rev. Isaac Bell, who owned the adjacent property. In 1858, a ferry was established near this site. On January 2, 2006, the remaining span of Bells Ford Bridge collapsed. Salvage operations have begun, but at this time it is not known whether the bridge will be rebuilt.

in the opposite direction across two panels. The tops of the posts and braces are joined to the upper chord and lateral bracing with a pin and contained within a joint box. The end post has a cast joint box to receive the end post and lower chord.

Transverse steel I-beams are suspended below the lower at every panel point. There are eight lines of stringers placed longitudinally on top of the floor beams. The decking is two layers of narrow boards, one laid transversely and one laid longitudinally on top of the stringers. Upper lateral bracing consists of tie beams notched into the upper chord and cross bracing between the tie beams.

The roof is made up of rafters whose lower ends rest on the upper chord and whose upper ends meet at the ridge to form a gable. The roof is covered with wood shingles nailed to purlins on top of the rafters. Vertical plank siding fastened to longitudinal nailers on the outer faces of the trusses covers the exterior of the bridge. The siding reaches to just below the eaves, leaving a narrow opening at the top for light and ventilation. The portals are straight and square with no overhang.

## History

Originally known as “Mules Crossing,” the present-day community of Seymour, Indiana, was settled by James Shields in 1816. His son, Meedy W. Shields, platted the town in 1852, when the Jeffersonville, Madison & Indianapolis Railroad was completed and the Ohio & Mississippi Railroad was proposed.<sup>5</sup> Located at the intersection of north-south and east-west railroad lines, the town quickly became a center of commercial activity and in 1864, with a population of 1,533, Seymour was incorporated as a city.

In 1867, a group of prominent residents formed a citizen’s association to encourage local improvements, including construction of a bridge across the White River west of town. Debate over the proposed location for the bridge led to the formation, in 1868, of three companies authorized to finance and build toll bridges. The Seymour Bridge Company was the first of three companies formed.<sup>6</sup> Two weeks later, a “Notice to Bridge Builders” appeared in the local paper:<sup>7</sup>

Bids will be received for the superstructure and masonry of a Bridge across White River near Bells Ford, Jackson County, Indiana until 2 o’clock, p.m. July 23, 1868. Plans and specifications can be seen at the store of Thomas L. Ewing, in Seymour, Ind.—Bids for the construction of other plans, iron, wood, or combination, will also be received and considered. Bids must cover the entire cost.

John H. Blish, President Seymour Bridge Company<sup>8</sup>

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<sup>5</sup> The town was named for the railroad company’s chief engineer Henry Seymour.

<sup>6</sup> The Brownstown (Shieldstown) Bridge was built in 1876, and the Rockford Bridge was built in 1871.

<sup>7</sup> *Seymour Democrat*, July 8, 1868, p.2.

<sup>8</sup> John Blish was Meedy Shields’ son-in-law.

The Seymour Bridge Company awarded the bridge contract to railroad engineer Col. Robert Pattison (1825-1885).<sup>9</sup> The contract specified a masonry pier and abutments, a 200' timber trestle approach on the east end, and a "Post Patent Combination Bridge" superstructure. McNairy, Claflen & Company of Cleveland, Ohio, fabricated the superstructure, which was then shipped to the site by rail.<sup>10</sup> Construction began in August and was completed in December 1868. The bridge officially opened to traffic on January 2, 1869. The newspaper reported this milestone as follows:

This structure, the successful completion of which was looked forward to with so much interest and anxiety by our people, is at last completed. By Saturday White River can be crossed in a moment without asking any favors of its turbid waters. This is an achievement of which our citizens may well feel proud, as showing their enterprise and liberality. The Bridge Company awarded the contract to Mr. Robert Pattison, and to his energy and ability, is due in a great measure the rapid completion of the work.<sup>11</sup>

The bridge cost \$20,000, plus an additional \$1,871.37 for earthwork and approaches. W. L. Hull was paid \$35.00 for plans and specifications.<sup>12</sup> The Board of Directors accepted the bridge on January 6, 1869. The Board of Directors appointed John Bowman toll keeper and set the rates of toll as follows:

For each Four horse vehicle twenty five cents  
For each Two horse vehicle fifteen cents  
For each One horse vehicle ten cents  
For each horseman Three cents  
For each footman Three cents  
For Cattle Horses and Mules each three cents  
For Hogs and Sheep each one and a half cents  
For each Six horse vehicle twice as much as for each two horse vehicle<sup>13</sup>

In 1874, the Seymour Bridge Company, along with the Rockford Bridge Company and Brownstown Bridge Company, turned over their stock to the county, and the three bridges across

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9 Railroad contractor Robert Pattison (1825-1885) was involved with the construction of the Louisville & Nashville, Ohio & Mississippi and Lake Erie, Evansville & Southwestern, and Belfontaine, Seymour & Evansville railroads.

10 In 1864, Henry M. Claflen (1835-1901) and Albert McNairy (1815-) established the firm of McNairy, Claflen & Co. at Cleveland, Ohio. A successor to Thatcher, Burt & Co., the company manufactured railroad cars and built wood and iron bridges "in nearly every state in the Union." In 1870, the company was reincorporated as Cleveland Bridge & Car Works. That company continued until 1896.

11 *Seymour Democrat*, December 30, 1868, p.3.

12 The plans and specifications have not been located, but Hull's name is found in Seymour Bridge Company Records, Jackson County Courthouse, Brownstown, Indiana.

13 Jackson County Commissioners Records, Book 8, January 20, 1869, p.160-61.

White River were made free.<sup>14</sup> The *Seymour Times* reported, “The Seymour, Rockford and Brownstown bridges over White river have been thrown open to public travel free. This is right.”<sup>15</sup>

As originally built, the Bells Ford Bridge was not covered, except for the upper chords. During routine repairs in 1876, the discovery of some rotten timbers sparked a campaign to cover the bridge. Items like this one ran in the local newspaper: “That bridge will soon rot down if not covered. ... It is of far greater importance to take care of and protect the bridges we have than to build new ones.”<sup>16</sup> The Bells Ford Bridge was covered in the late 1870s or early 1880s, although the exact date is not known. The bridge was made free and turned over to the county in 1896.

The bridge carried vehicular traffic for a century, until it was bypassed in 1970. In 1999, the westerly span of the bridge collapsed in a windstorm. In 2004, the Jackson Parks Department obtained a grant to reconstruct and rehabilitate the bridge. J.A. Barker Engineering is in charge of this challenging preservation project.

## Design

A house joiner from Lebanon, New Hampshire, Simeon S. Post (1805-1872) began his engineering career building bridges for the New York & Erie Railroad.<sup>17</sup> In 1853, Post went to Indiana to supervise construction of the Ohio & Mississippi Railroad.<sup>18</sup> While there, he presumably met Meedy Shields, Robert Pattison and others involved in railroad construction. In 1855, Post returned to the New York & Erie Railroad as consulting engineer and subsequently consulted on numerous railroad and tunnel projects around the country.

In 1863, Post received a patent for improvements in iron bridges, consisting of joint boxes and pins that connected the chords and web members.<sup>19</sup> Though not part of his claim, the patent drawing showed the distinctive truss configuration now known as the Post truss.<sup>20</sup> The Post truss featured parallel inclined compression and tension members. The size of the chords increase toward midspan, where maximum bending moments occur, while the size of the members increase toward the ends of the span, where maximum shear occurs. Because engineering analysis for train loadings was still in its infancy, the Post truss, like the Whipple, Bollman, Haupt and Fink trusses, relied on redundant members to prevent catastrophic failure.

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14 Bells Ford Bridge was a toll bridge for the second time from 1882 to 1896, when it was part of the Seymour, Courtland & Freetown Gravel Road. The bridge was owned and maintained by the county from 1896 to 1932; it was under state purview from 1932 to 1970, and subsequently reverted back to the county.

15 *Seymour Times*, March 14, 1874, p.3.

16 *Seymour Weekly Times*, July 8, 1876, p.3.

17 In this capacity, Post would have met railroad engineer Henry Seymour.

18 McNairy & Claflen Manufacturing Company fabricated a number of these bridges.

19 Simeon S. Post, United States Letters Patent No. 38,910, June 16, 1863.

20 Simeon's son, Andrew J. Post, received a patent in 1868 which also shows the Post truss geometry, but with wood and iron members.



The Post truss design was first used on the Erie Railroad at Washingtonville, New York in 1865. The type's redundant members allowed it to remain rigid under live loads, and it enjoyed a brief but vigorous period of popularity in the 1860s and 70s.<sup>21</sup> In 1868, the Post truss received national recognition when the Union Pacific Railroad used it for the largest bridge on its line, spanning the Missouri River between Council Bluffs, Iowa and Omaha, Nebraska.<sup>22</sup> Use of the Post truss even ventured outside the United States, when in 1876, the Watson Manufacturing Company built three Post truss bridges in Brazil. Railroads reportedly built hundreds of combination Post trusses, but more efficient and economical structures replaced these bridges before the turn of the century.<sup>23</sup> The type was also used for highway bridges, though to a lesser extent. The four surviving examples of this type are highway bridges. The popularity of the Post truss ended around 1880. The last two decades of the nineteenth century saw increasing uniformity and standardization of bridge trusses.

The Bells Ford Bridge symbolizes the significant role railroads played in the development of bridge truss technology in the mid-nineteenth century. It is the only combination Post truss bridge, and one of only four Post truss bridges of all types, surviving in the United States (see Appendix A).

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21 Companies that built Post truss bridges included: McNairy Claflin & Company/Cleveland Bridge & Car Works (Cleveland, Ohio), Atlantic Bridge Works (New York, New York), L.B. Boomer & Company (Chicago, Illinois), Watson Manufacturing Company (Paterson, New Jersey), Detroit Bridge Works (Detroit, Michigan), J.H. Cofrode & Co. (Philadelphia, Pennsylvania).

22 The Illinois & St. Louis Bridge Company completed that bridge in 1872. The Chicago, Burlington & Quincy Railroad and Missouri, Kansas & Texas Railroad subsequently built Post truss for their Missouri River crossings.

23 Many long-span Post trusses were replaced with cantilever structures, while Pratt or Warren trusses became the engineers' choice for shorter spans.

**Appendix A: Surviving Post Truss Bridges in the United States**

14-36-03	Bells Ford Bridge	Jackson County, IN	1868	wood/iron Post thru truss	McNairy, Claflin Co.
	Ponakin Road Bridge (see HAER No. MA-13)	Worcester County, MA	1871	iron Post thru truss	Watson Manufacturing Co.
	Atherton Bridge (see HAER No. MA-17)	Worcester County, MA	1870	iron Post pony truss	J.H. Cofrode & Co.
	Falling Rock Camp Bridge (see HAER No. OH-89)	Licking County, OH (moved in 1927 and 1931)	c1872	iron Post pony truss	Builder unknown <sup>24</sup>

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<sup>24</sup> No written records have been found regarding the builder or date of construction, but fabrication details suggest that this bridge may have been built by McNairy, Claflin & Co. (after 1870, Cleveland Bridge & Car Works) of Cleveland, Ohio.

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